

PCT

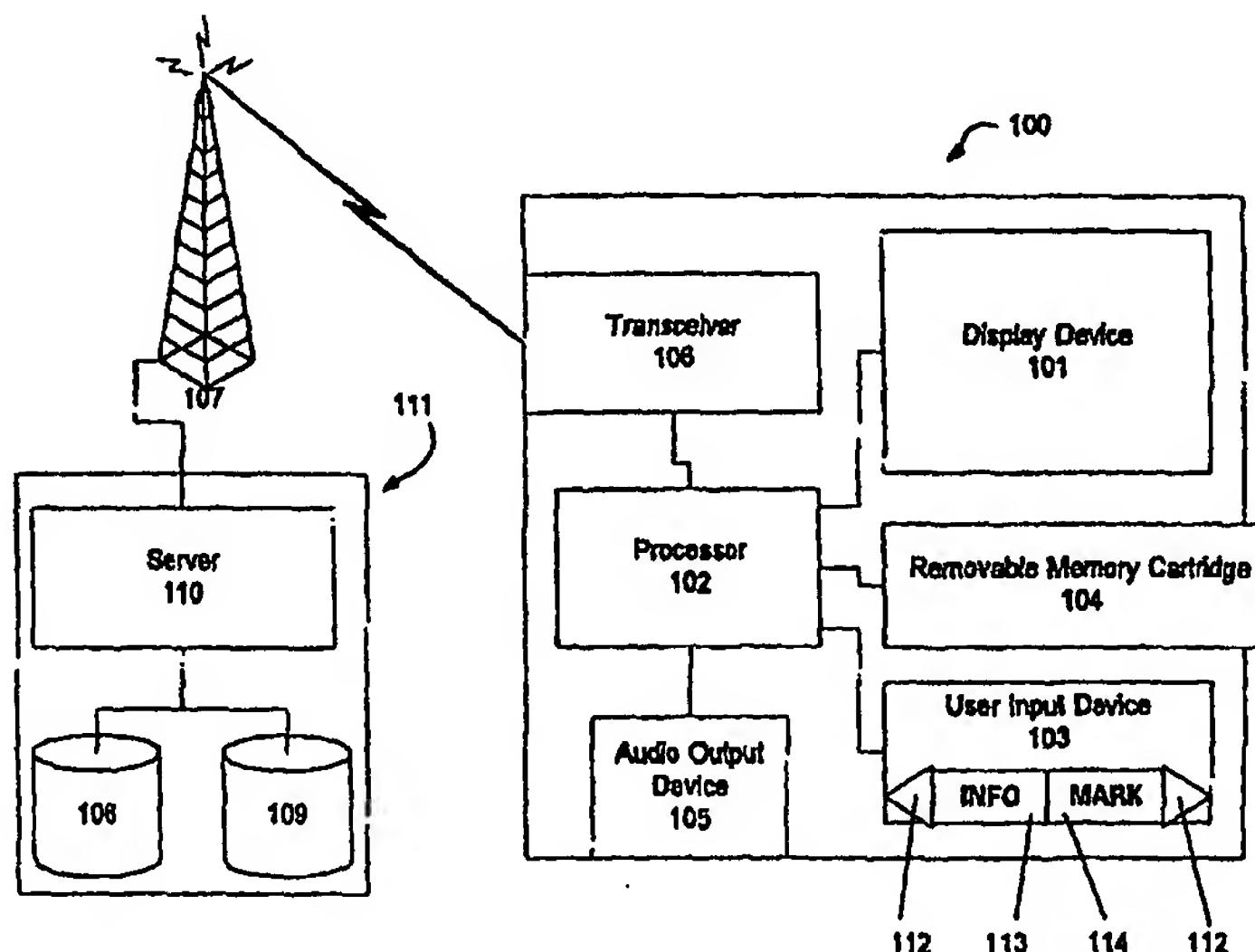
WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>7</sup> :  H04H 1/00	A1	(11) International Publication Number: <b>WO 00/31906</b>  (43) International Publication Date: 2 June 2000 (02.06.00)
(21) International Application Number: PCT/US99/20788  (22) International Filing Date: 14 September 1999 (14.09.99)  (30) Priority Data: 09/197,506 23 November 1998 (23.11.98) US  (71) Applicant: SONY ELECTRONIC INC. [US/US]; 1 Sony Drive, Park Ridge, NJ 07656 (US).  (72) Inventors: GIOSCIA, Richard; 38 Winding Trail, Mahwah, NJ 07430 (US). SONODA, Yumi; 1022 South Springer Road, Los Altos, CA 94024 (US). ZOELS, Jan-Christoph; 33 Flatbush Avenue, Brooklyn, NY 11217 (US).  (74) Agent: KANANEN, Ronald, P.; Rader, Fishman & Grauer PLLC, Suite 501, 1233 20th Street, N.W., Washington, DC 20036 (US).	(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.	

(54) Title: METHOD AND SYSTEM FOR INTERACTIVE DIGITAL RADIO BROADCASTING AND MUSIC DISTRIBUTION



(57) Abstract

A method and system for providing easier listener access to information about musical works and other audio programming broadcast by a digital radio station (111) includes broadcasting contextual information about the audio programming along with the audio programming. A receiver (100) receives the broadcast. A processor (102) in the receiver (100) separates the audio and data signals giving the listener access to the broadcast content through an audio output device (105) and to the associated information about that content on a display device (101). The system may also store the contextual information about the programming in a memory unit (104) for later reference, for example ordering a recording of the programming.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		

TITLE OF THE INVENTION

**Method and System for Interactive Digital Radio**

5   **Broadcasting and Music Distribution**

FIELD OF THE INVENTION

The present invention relates to the fields of interactive music broadcasting and commercial music distribution. More particularly, the present invention relates to a method and system for allowing a listener to designate and store information about music, such as title and artist, as the music is received from a broadcast service provider.

15

BACKGROUND OF THE INVENTION

Radio broadcasting is an important source of news, information and entertainment for most people around the world. As a result, advertisers are willing to pay substantial sums of money to promote products and services on the radio. This source of revenue allows radio stations to provide programming which will draw the listeners desired by advertisers.

A particular radio station, depending on its format, may broadcast a specific type or types of music, talk shows, news, locally relevant information or a combination of any or all of these. Listeners will identify those stations that provide the type of programming desired and access those stations.

30   Radio receivers used by listeners to hear radio broadcasts are of at least three general types: stationary units, automobile units and portable personal units. A stationary radio receiver may be incorporated into a home stereo system or may be a stand-alone unit plugged into an electrical wall outlet. Radio receivers are also found in almost all automobile sound systems.

Finally, radio receivers may be portable battery-powered units that can be carried with or worn by the listener.

In addition to promoting the products of paid advertisers, radio broadcasts of music also promote the  
5 sale of musical works. Radio broadcasting is a principal showcase for debuting newly released musical works. Listeners are frequently first alerted to newly-released works of their favorite artists by hearing those works played on the radio. Additionally, listeners often come  
10 to appreciate the work of a new or established artist by hearing that work over the radio.

After becoming acquainted with a musical work in this manner, a listener typically goes to a music store to buy a recording of the music. This requires that the  
15 user be informed of the title and artist by the radio broadcast. If the announcer does not state the artist or title of a musical work being broadcast, or if the listener misses that part of the broadcast, the listener may have difficulty identifying a recording of the work  
20 at a music store. Additionally, a listener may have an interest in obtaining more information about a musical work or artist than is generally provided by a radio announcer.

Consequently, there is a need in the art for a  
25 method and system for providing listeners with appropriate information about musical and other audio programming in a radio broadcast. Moreover, there is an additional need in the art for providing listeners with a ready and easy means of storing such information until it  
30 is wanted, for example, to identify a recording to be purchased.

Additionally, a listener may have some interest in a particular musical work heard on the radio, but may not yet have made a decision to purchase a recording of the  
35 work. Typically, in such circumstances, the listener must wait until the radio station has, in the regular

course of its formatting, played the work enough times for the listener to decide whether he or she wishes to purchase a recording of the work.

Consequently, there is a need in art for a method  
5 and system which allows a radio listener to achieve greater familiarity with an identified work without having to wait for the radio station to replay the work. There is also a need for a method and system which more easily allows a user to purchase a recording of an  
10 identified musical work which has been heard in a radio broadcast.

#### SUMMARY OF THE INVENTION

It is an object of the present invention to meet the  
15 above-described needs and others. Specifically, it is an object of the present invention to provide a method and system of providing listeners with contextual information about musical works and other audio programming contained in a radio broadcast. It is a further object of the  
20 invention to provide listeners with a ready and easy means of recording such contextual information for later reference.

It is a further object of the present invention to provide a method and system with which a radio listener  
25 can quickly become more familiar with a new musical work in which the listener has some interest. Finally, it is an object of the present invention to provide a method and system for facilitating the purchase of a recording of a musical work that a listener has been introduced to  
30 by a radio broadcast.

Additional objects, advantages and novel features of the invention will be set forth in the description which follows or may be learned by those skilled in the art through reading these materials or practicing the  
35 invention. The objects and advantages of the invention

may be achieved through the means recited in the attached claims.

To achieve these stated and other objects, the present invention may be embodied and described as a 5 method of providing listeners with information about audio programming being digitally broadcast. The method includes combining a data signal carrying contextual information about the audio programming with an audio signal carrying the audio programming, and broadcasting 10 the combined data and audio signals as a digital radio signal.

Listeners with digital radio receiver then complete the method by receiving the combined data and audio signals with a receiver; separating the data and audio 15 signals; and transducing the audio signal into audible sound. The method also preferably includes displaying the contextual information of the data signal on a display device of the receiver.

The present invention also encompasses a receiver 20 for receiving a broadcast signal which is an audio signal and a data signal combined, the data signal containing contextual information about audio programming carried by the audio signal. The receiver includes: a transceiver for receiving the broadcast signal; a signal processor 25 for separating the audio and data signals; and an audio output device for outputting the audio signal.

Preferably, the receiver also has a display device for displaying the contextual information of the data signal. A user input device may be provided for 30 controlling the display of the contextual information on the display device.

A memory cartridge is preferably included in the receiver for storing at least a portion of the contextual information of the data signal. This cartridge is 35 preferably a removable memory cartridge. The user input device is also used for controlling the storage of

contextual information in the memory cartridge and accessing stored contextual information in the memory cartridge.

The receiver also preferably includes a connection  
5 between the processor and a service provider over which at least a portion of the contextual information may be transmitted to identify particular audio programming to the service provider. This connection may be wireless. The user input device is again used for controlling the  
10 transmission of contextual information over the connection to the service provider and for generating requests to be transmitted to the service provider to purchase a recording of the particular audio programming.

The recording of the audio programming purchased may  
15 be shipped to the listener, or may be transmitted electronically by the service provider to the processor. If the recording is received electronically, the receiver preferably includes a memory device for storing the audio programming and any additional contextual information  
20 received over the connection from the service provider.

The present invention also encompasses a method for receiving a broadcast signal which is an audio signal and a data signal combined, the data signal containing contextual information about audio programming carried by  
25 the audio signal. This method includes the steps of receiving the broadcast signal with a transceiver; separating the audio and data signals with a signal processor; and outputting the audio signal.

The method may also include displaying the  
30 contextual information of the data signal with a display device; controlling the display of the contextual information on the display device with a user input device; and storing at least a portion of the contextual information of the data signal in a removable memory  
35 cartridge.

The present method may also include purchasing a recording of the audio programming by transmitting at least a portion of the contextual information to a service provider to identify the audio programming. This  
5 step may be performed wirelessly.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate the present invention and are a part of the specification. Together  
10 with the following description, the drawings demonstrate and explain the principles of the present invention.

Fig. 1 is an illustration of a system for providing and recording contextual information about the musical works in a radio broadcast according to the principles of  
15 the present invention.

Fig. 2 is an illustration of system for allowing listeners to become better acquainted with musical works identified in a radio broadcast and for facilitating the purchase of recordings of those works according to the  
20 principles of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Using the drawings, the preferred embodiments of the present invention will now be explained.

25 As shown in Fig. 1, a system according to the principles of the present invention includes a digital radio receiver 100 for receiving a digital data broadcast from a service provider 111. The digital data received by the receiver 100 includes music or other audio  
30 programming and contextual information about that programming.

The contextual information includes, but is not limited to, identification of the artists or performers involved in producing the music or audio programming  
35 being broadcast; the title of the work, the album on which it is included and a listing of other works on that

album; cover art from the packaging of the commercial recording of the work; lyrics; notes about the work by the artists or songwriters; biographical information about the artists or songwriters; etc. For purposes of 5 this discussion, contextual information includes any information about or related to the artists or music or other audio programming being broadcast.

The broadcaster 111 has a music database 108 of the music or other audio programming available for broadcast. 10 A second database 109 contains contextual information about the works in the music database 108. With a server 110, the broadcaster 111 can access the programming in database 108 and the related contextual information in database 109 to prepare a coordinated transmission of 15 programming and contextual information.

In order to simultaneously broadcast the programming content and related contextual information, the broadcast should preferably be in digital format. The digital format readily provides the necessary capability for 20 providing both content and contextual data simultaneously. A digital radio transmitter 107 of the service provider 111 transmits the coordinated signal to a digital transceiver 106.

The digital transceiver 106 is part of a radio unit 25 100 owned by a listener. The radio unit 100 may be a stationary unit, an automobile radio unit or a personal, portable radio unit.

As shown in Fig. 1, the radio unit 100 includes a processor 102 that receives the incoming broadcast from 30 the transceiver 106. The processor 102 separates the audio signal carrying the music or other audio programming from the data signal carrying the contextual information.

The audio signal is provided to an audio output 35 device 105. The audio output device 105 may be, for example, a speaker system, wireless headphones or a port

into which headphones or other listening devices are plugged. Thus, the audio output device 105 is any device for transducing the audio signal of the digital broadcast into audible sound for the listener.

5       The contextual information carried by the data signal is displayed by the processor 102 on a display device 101. The display device 101 may be any device on which some or all of the contextual information can be displayed. However, the display device 101 is preferably  
10      a color or monochromatic liquid crystal or electroluminescent or FED display device capable of displaying both text and images. Contextual information images may include cover art or photos of the artists.

15      A user input device 103 is also connected to the processor 102. With the user input device 103, the listener can tune to different radio stations and input other instructions or data to the processor 102. The user input device 103 may be any device which can perform these functions. For example, the user input device 103  
20      may include any of a dial or knob, a keypad, or a trackball or joystick used in conjunction with the display device 101.

25      Preferably, the user input device 103 will have several dedicated buttons. One such button 114 may be marked "STORE," "MARK" or "BOOKMARK." Another button 113 may be marked "INFO." Two other buttons 112 may indicate opposing arrows.

30      The following is an example of how a user may operate the radio 100 according to the present invention.  
35      To begin, a listener may use the arrow keys 112 to tune the transceiver 106 over the range of radio frequencies to receive a particular radio broadcast. The range of frequencies may be displayed on the display device 101 along with an indication of the frequency currently being received.

If the user hears a particular musical work about which he or she desires more information, the INFO button 113 is pressed. In response, the processor 102 displays the contextual information associated with that musical 5 work on the display device 101. The listener may use, for example, the arrow keys 112 to navigate through the available contextual information.

If the user wishes to store the contextual information for later retrieval, e.g. the user wishes to 10 purchase a recording of the music being broadcast, the user presses the MARK key 114. In response, some or all of the contextual information is saved by the processor 102 to the removable memory cartridge 104. The processor can then retrieve and display the information stored in 15 the cartridge 104 when the user wishes to access that information.

Fig. 2 illustrates another embodiment of a radio receiver 205 according to the present invention. The radio receiver 205 is a stationary receiver, e.g. a home 20 stereo unit. Like the receiver 100 of Fig. 1, the receiver 205 of Fig. 2 has a processor 102, transceiver 106, display device 101, user input device 103, audio output device 105 and removable memory cartridge 104. These common elements perform the same functions as 25 described in connection with the receiver 100 of Fig. 1.

An example of the use of the receiver 205 of Fig. 2 will now be given. If a listener had been in his or her car or using a personal or portable radio and had stored contextual information about a broadcast to a removable 30 memory cartridge 104, that cartridge 104 could be inserted into the home stereo receiver 205. With the user input device 103, a listener could then access the information on the memory cartridge 104 and display the same on the display device 101.

35 The processor 102 of the receiver 205 in Fig. 2 is provided with a connection 203 to a service provider 202.

The connection 203 may be, for example, a telephone line, in which case, the processor 102 would include a modem. The phone line 203 may be used to connect directly to a server 204 of the service provider 202. Alternatively, 5 the connection 203 may be over a computer network such as the internet or a wireless phone connection.

With the contextual information received from the broadcaster 111, the processor 102 may identify to the server 204 those musical works in which the user is 10 interested. The user may then download from the service provider 202, for example, additional contextual information about the work, a sample or copy of the work, a sample of other musical works on the same album, a sample of other musical works by the same artist or 15 contextual information about other works by the same artist. Additional contextual information may include the price of a recording of the work.

This downloaded information may be stored on the removable memory cartridge 104 or on a hard drive 201. 20 If the downloaded information includes a musical work or a sample of one or more musical works, and the downloaded information is stored to the removable memory cartridge 104, the cartridge 104 may be removed and inserted in another receiver according to the present invention, for 25 example, a portable personal receiver. That second receiver may then access and play the musical samples.

Additionally, using the user input device 103, the user may transmit a signal to the service provider 202 indicating an order to purchase or rent a recording of an 30 indicated musical work. The service provider 202 may have the requested recording shipped to the user. Payment may be by subscription or on credit.

Alternatively, the service provider 202 may download the purchased recording electronically to the hard drive 35 201. The user may then keep the recording in the receiver 205, or the receiver 205 may be interfaced with

a recording device, e.g. a tape recorder, harddrive or flashmemory device or a writeable compact disc drive, to produce a physical recording of the purchased musical work.

5       The preceding description has been presented only to illustrate and describe the invention. It is not intended to be exhaustive or to limit the invention to any precise form disclosed. Many modifications and variations are possible in light of the above teaching.

10      For example, the digital radio broadcaster 111 and the music vendor 202 may be the same party. In such a case, rather than the wire connection 202, the processor 102 may transmit purchase orders and requests for additional contextual information wirelessly with the  
15     transceiver 106. In such an embodiment, the user might also be able to obtain a listing from the server 110 of the musical works available in database 108 and request a transmission of that particular work.

These preferred embodiments were chosen and  
20     described in order to best explain the principles of the invention and its practical application. The preceding description is intended to enable others skilled in the art to best utilize the invention in various embodiments and with various modifications as are suited to the  
25     particular use contemplated. It is intended that the scope of the invention be defined by the following claims.

WHAT IS CLAIMED IS:

1. A method of providing listeners with information about audio programming being digitally broadcast comprising combining a data signal carrying contextual information about said audio programming with an audio signal carrying said audio programming.

2. The method of claim 1, further comprising broadcasting said combined data and audio signals as a digital radio signal.

3. The method of claim 1, further comprising: receiving said combined data and audio signals with a receiver (100); separating said data and audio signals; and transducing said audio signal into audible sound.

4. The method of claim 3, further comprising displaying said contextual information of said data signal on a display device (101) of said receiver (100).

5. A receiver (100) for receiving a broadcast signal which is an audio signal and a data signal combined, said data signal containing contextual information about audio programming carried by said audio signal, said receiver (100) comprising:

a transceiver (106) for receiving said broadcast signal;

30 a signal processor (102) for separating said audio and data signals; and

an audio output device (105) for outputting said audio signal.

6. The receiver of claim 5, further comprising a display device (101) for displaying said contextual information of said data signal.

5 7. The receiver of claim 6, further comprising a user input device (103) for controlling said display of said contextual information on said display device (101).

10 8. The receiver of claim 5, further comprising a memory cartridge (104) for storing at least a portion of said contextual information of said data signal.

9. The receiver of claim 8, wherein said memory cartridge (104) is a removable memory cartridge.

15 10. The receiver of claim 8, further comprising a user input device (103) for controlling said storage of contextual information in said memory cartridge (104) and accessing stored contextual information in said memory cartridge (104).

20 25 11. The receiver of claim 5, further comprising a connection between said processor (102) and a service provider (111) over which at least a portion of said contextual information may be transmitted to identify particular audio programming to said service provider (111).

30 12. The receiver of claim 11, further comprising a user input device (103) for controlling transmission of contextual information over said connection to said service provider (111) and for generating requests to be transmitted to said service provider (111) to purchase a recording of said particular audio programming.

13. The receiver of claim 11, further comprising a memory device (104) for storing audio programming and contextual information received over said connection from said service provider (111).

5

14. The receiver of claim 11, wherein said connection to said service provider (111) is a wireless connection (106, 107).

10 15. A method for receiving a broadcast signal which is an audio signal and a data signal combined, said data signal containing contextual information about audio programming carried by said audio signal, said method comprising:

15 receiving said broadcast signal with a transceiver (106);

separating said audio and data signals with a signal processor (102); and

outputting said audio signal.

20

16. The method of claim 15, further comprising a displaying said contextual information of said data signal with a display device (101).

25 17. The method of claim 16, further comprising controlling said display of said contextual information on said display device (101) with a user input device (103).

30 18. The method of claim 15, further comprising a storing at least a portion of said contextual information of said data signal in a removable memory cartridge (104).

35 19. The method of claim 15, further comprising purchasing a recording of said audio programming by

transmitting at least a portion of said contextual information to a service provider (111) to identify said audio programming.

5        20. The method of claim 19, wherein said transmitting to a service provider (111) is performed by wirelessly transmitting to said service provider (111).

10        21. The method of claim 15, further comprising:  
transmitting at least a portion of said contextual information to a service provider (111) to identify said audio programming; and  
receiving from said service provider (111)  
additional contextual information for said audio  
15        programming.

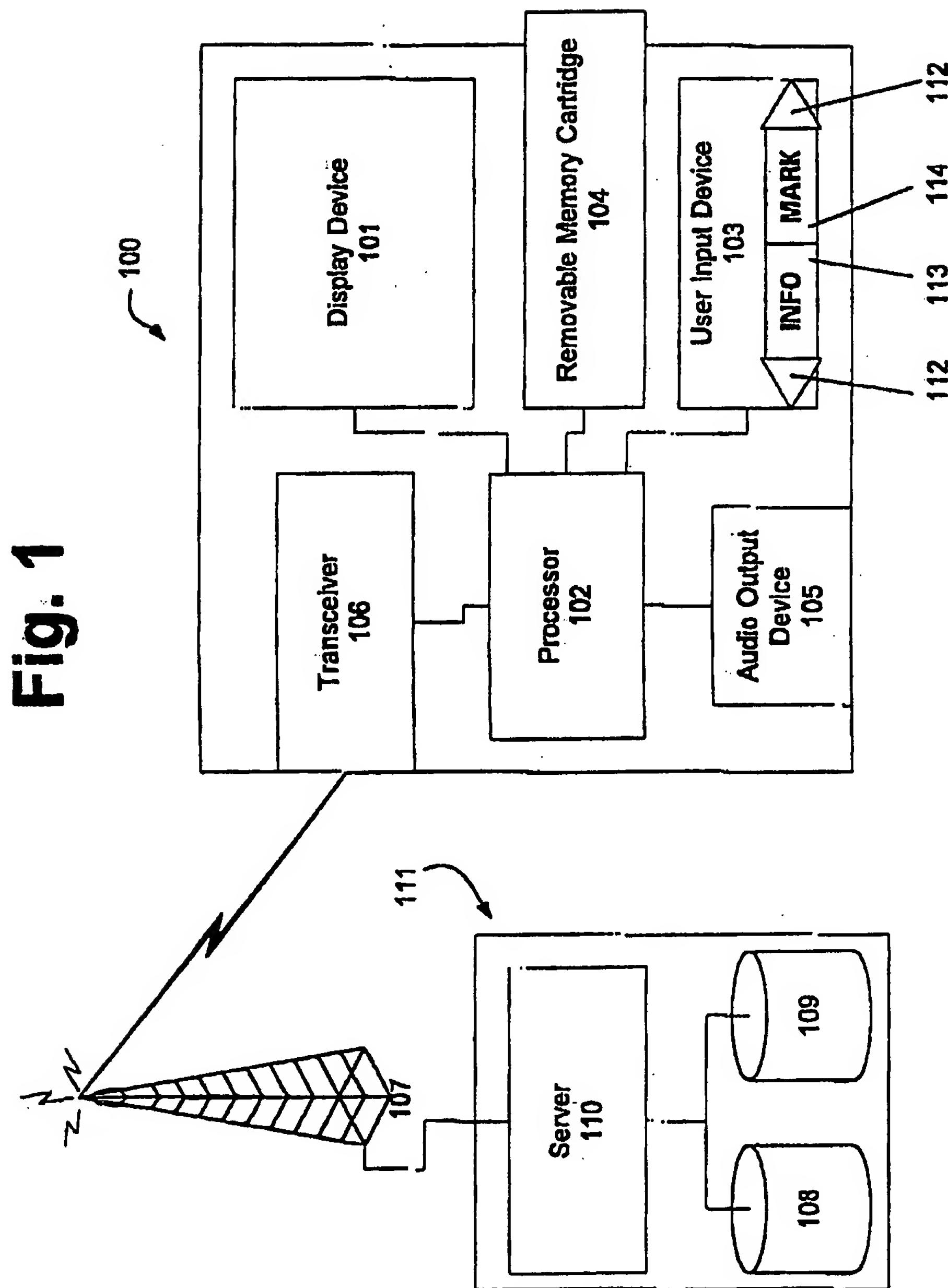
20        22. A receiver (100) for receiving a broadcast signal which is an audio signal and a data signal combined, said data signal containing contextual information about audio programming carried by said audio signal, said receiver (100) comprising:  
means for receiving said broadcast signal (106);  
means for separating said audio and data signals (102); and  
25        means for outputting said audio signal (105).

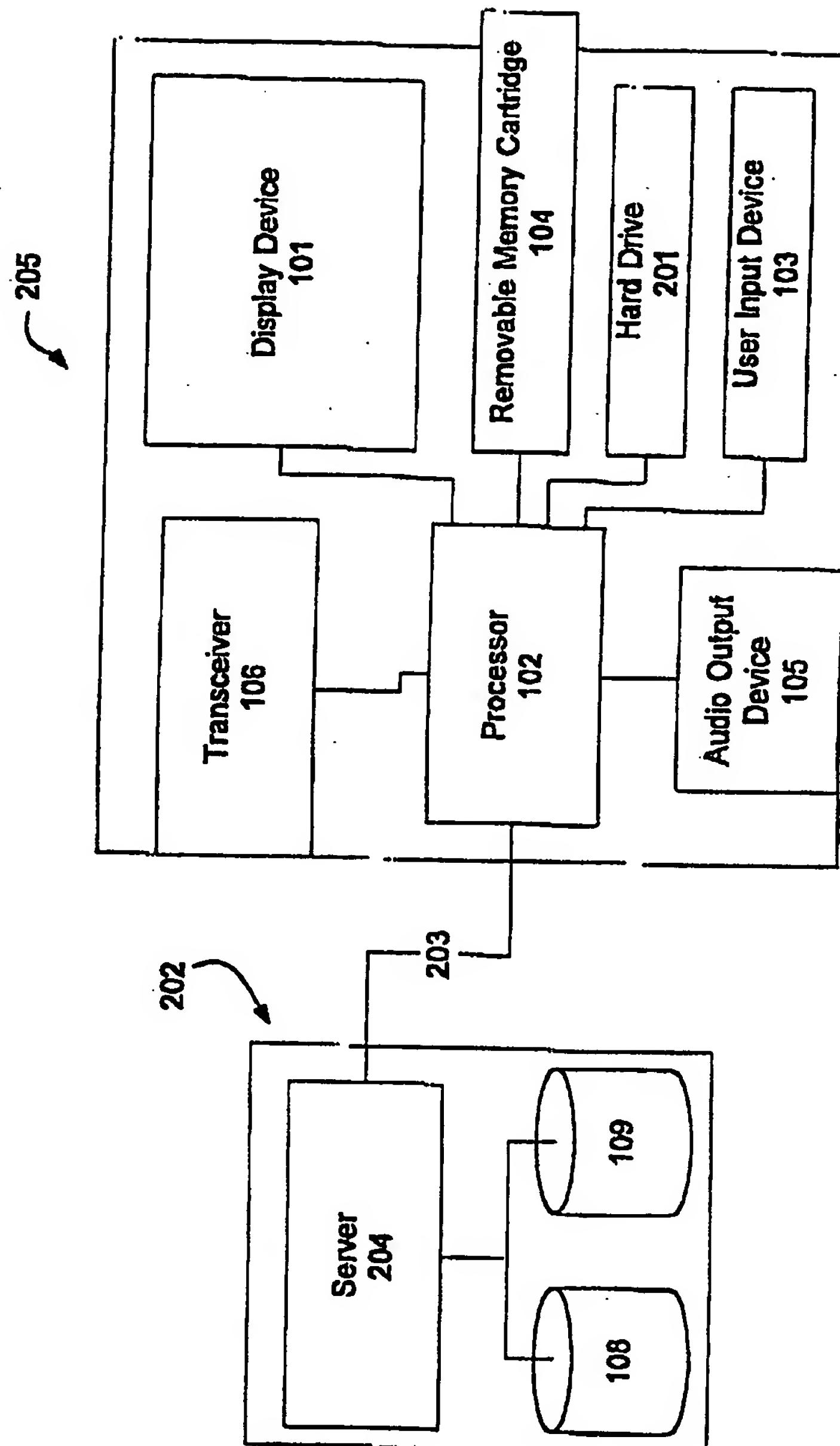
30        23. The receiver of claim 22, further comprising means for displaying said contextual information of said data signal (101).

24. The receiver of claim 23, further comprising means for controlling said display of said contextual information (103) on said display device (101).

25. The receiver of claim 22, further comprising means for storing at least a portion of said contextual information of said data signal (104).

5        26. The receiver of claim 22, further comprising a means for transmitting (106) at least a portion of said contextual information to a service provider (111) to purchase a recording of said audio programming.



**Fig. 2**

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US 99/20788

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC 7 H04H1/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category •	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 594 779 A (GOODMAN WILLIAM) 14 January 1997 (1997-01-14) column 10, line 8-65 column 11, line 18 -column 13, line 17 column 14, line 63 -column 18, line 16; claims 1-3,10-13; figures 1-4,7  US 5 564 073 A (TAKAHISA TSUTOMU) 8 October 1996 (1996-10-08) column 5, line 34 -column 6, line 54; claims 1-3; figures 2-4  -/-/	1-26
X		1,3-10, 15-18, 22-25

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

26 April 2000

Date of mailing of the international search report

03/05/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Pantelakis, P

**INTERNATIONAL SEARCH REPORT**

Internatio	Application No
PCT/US 99/20788	

**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 843 429 A (KENWOOD CORP) 20 May 1998 (1998-05-20)	1-8,10, 15-17, 22-25
Y	column 1, line 48 -column 2, line 53  column 3, line 31 -column 4, line 13; claims 1-6; figure 3 —	9,11-14, 18-21,26
Y	US 5 703 795 A (MANKOVITZ ROY J) 30 December 1997 (1997-12-30)	9,11-14, 18-21,26
A	column 7, line 6 -column 8, line 20  column 8, line 55 -column 11, line 15 column 13, line 20-59 column 16, line 21-25; claims 21,22,42-44,50-53,60; figures 1-4,7 —	6-8,10, 16,17
X	EP 0 797 322 A (GEN INSTRUMENT CORP) 24 September 1997 (1997-09-24)	1,3-10, 15-18, 22-25
	page 3, line 14-33 page 4, line 2-44 page 5, line 1-25 page 9, line 9-11 page 11, line 17-28; claims 1,3,4,6,7,9,11,13-16,19-22,25,27,28; figures 1,2,4-6,20,21,4,25 —	
A	US 5 742 893 A (FRANK ARMIN) 21 April 1998 (1998-04-21) column 2, line 3-22 column 2, line 55-61 column 3, line 56 -column 4, line 21; claims 1,6,7,9,10; figures 1,2 —	8-14,18, 20

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No
PCT/US 99/20788

Patent document cited in search report	Publication date		Patent family member(s)	Publication date
US 5594779 A	14-01-1997		US 5694455 A US 6029064 A	02-12-1997 22-02-2000
US 5564073 A	08-10-1996		US 5491838 A EP 0705506 A WO 9424784 A US 5579537 A US 5577266 A US 5812937 A	13-02-1996 10-04-1996 27-10-1994 26-11-1996 19-11-1996 22-09-1998
EP 0843429 A	20-05-1998		JP 10150377 A DE 843429 T	02-06-1998 24-09-1998
US 5703795 A	30-12-1997		AU 5392496 A EP 0809899 A WO 9616491 A AU 2290295 A EP 0755607 A WO 9528803 A AU 668751 B AU 4644493 A CA 2115772 A DE 69320609 D DE 69320609 T EP 0604639 A ES 2123060 T JP 7500715 T WO 9400842 A	17-06-1996 03-12-1997 30-05-1996 10-11-1995 29-01-1997 26-10-1995 16-05-1996 24-01-1994 06-01-1994 01-10-1998 06-05-1999 06-07-1994 01-01-1999 19-01-1995 06-01-1994
EP 0797322 A	24-09-1997		US 5784095 A AU 717439 B AU 7022896 A CA 2189488 A JP 2909032 B JP 10032807 A NO 964716 A	21-07-1998 23-03-2000 25-09-1997 22-09-1997 23-06-1999 03-02-1998 22-09-1997
US 5742893 A	21-04-1998		DE 4337726 A WO 9512929 A EP 0727114 A	11-05-1995 11-05-1995 21-08-1996

